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ABSTRACT

The purpose of this study was to examine the effects of an instrumental music pullout program on student achievement. Two hundred and twenty-three students were divided into 2 groups. The first group consisted of 46 instrumental music students in grades 4 and 5. The second group consisted of 177 students who did not participate in the instrumental music program. A two-sample independent t-test analysis was used to determine if there was a significant difference between the test scores of the students who were excused from class for 30 minutes twice a week for instrumental music study and those who were not involved in the music program. It was hypothesized that there would be no significant difference between the test scores of the two groups or that the test scores of the music students would be higher than the nonmusic students as measured in five academic areas of the California Tests of Basic Skills: reading, language comprehension, mathematics comprehension, science, and social studies. Findings support the first hypothesis; that is, no significant difference exists between the scores of instrumental music participants and nonparticipants. (Contains four tables.) (Author/SLD)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

A Comparison Study of the California Test of Basic Skills between Fourth and Fifth Grade Instrumental Music Pullout Students and Students Not Involved in the Instrumental Music Program

by
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The purpose of this study was to examine the effects of an instrumental music pullout program on student achievement. Two hundred and twenty three students were divided into two groups . The first group consisted of 46 instrumental music students in grades 4 and 5. The second group consisted of one hundred and seventy seven student who did not participate in the instrumental music program. A two- sample independent t-test analysis was used to determine if there was a significant difference between the test scores of the students who were excused from class for 30 minutes, twice a week for instrumental music study and those who were not involved in the instrumental music program.

It was hypothesized that there would be no significant difference between the test scores of the two groups or the test scores of the music students would be higher than the non-music students as measured in five academic areas of the C.T.B.S.: reading, language comprehension, math comprehension, science and social studies.

A Comparison Study of the California Test of Basic Skills between Fourth and Fifth Grade Instrumental Music Pullout Students and Students Not Involved in the Instrumental Music Program

In the recent past it has become apparent that administrations have come to regard instrumental music pullout programs as nuisance and a disturbance to the school day. English (1984) Superintendent of Northport-East Union Free School District, Long Island New York, describes the effects of pullout programs as:

> ...a nightmare for many elementary school principals, who view the practice as a kind of pernicious anemia that attacks whole class instruction time. (pg. 32)

or from the classroom ıevel:

> In the final analysis, students must know how to read, do math, have attained writing and thinking skills... With the current state of the pull-out syndrome, such proficiency is in severe jeopardy...(pg. 18)

Instrumental music can be quite frustrating to the classroom teacher since usually only a small number of students are involved. They are viewed as:

1. Disruptive to the class.
2. students miss instructional time.
3. Student involved will suffer academically.

The purpose of this study was to examine what effect the instrumental music pullout program in the elementary school in Anne Arundel County Maryland had on student achievement as measured by the California Test of Basic Skills. The study compared the achievements of instrumental music students (MS) and non-instrumental music students (NS). The following questions were examined:

1. Is there a significant difference between MS and NS in the reading section of the C.T.B.S.?

2. Is there a significant difference between MS and NS in the Language

Comprehension section of the C.T.B.S.?

3. Is there a significant difference between MS and NS in the Math comprehension section of the C.T.B.S.?

4. Is there a significant difference between MS and NS in the science section of the C.T.B.S.?

5. Is there a significant difference between MS and NS in the social studies section of the C.T.B.S.?

REVIEW OF LITERATURE

Many studies have been performed that demonstrate the possibility of a certain superiority among students who participate in the music program. These usually concentrate on the the aspect of academic superiority as an indicator for musical success.

Some may state, as Roger Rideout states in his opening paragraph,[1] that this could be a case of elitism except that he classifies music as re-creative. This, of course, is not entirely true when you take into account the Jazz idiom and its element of improvisation. It must be explained to students that they themselves are the final judge of their product. On the other hand, Bennet Reimer[2], in his response argues the very idea of elitism. The thought of someone being better than another seems to be incomprehensible. Everything must be judged by one set of standards.

Edwin Gordon uses music to enrich the development of culturally disadvantaged students. His study [3] compares the musical progress of students in a "normal" school to those in a disadvantaged setting. He uses established tests and measures such as the Musical Aptitude Profile to develop his correlations and results. Mr. Gordon concludes in this first study that the disadvantaged students will achieve significantly lower results than the more privileged students. However, he goes on to note that there could be many reasons for the differences including exposure to music at an early age, limited motivation outside the classroom, and other environmental consideration outside the classroom. He does intend to continue the study to find if the disadvantaged students improve their achievement in music in the ensuing years.

Edward J. Kvet conducted a study that might be used to show the superiority of students enrolled in an instrumental music program[4]. He examined the effects of removing these students from the regular class to attend the instrumental music class. It is generally accepted among educators, administrators and parents that the children who miss academic time due to instrumental music classes will have lower

[1] Roger Rideout, "A Response To The Question of Elitism" Council for Research in Music Education, no. 93 (Late Summer 1987): 17-22.

[2] Bennett Reimer, "A Response to the Question of Elitism: Elitism, Open and Shut" Council for Research in Music Education,. 93 (Late Summer 1987): 22-25.

[3] Gordon, Edwin "First Year Results of a Five Year Longitudinal Study of the Musical Achievement of Culturally Disadvantaged Students" Journal of Research In Music Education 18 (Fall 1970): 195-213.

[4] Kvet, Edward J. "Excusing Elementary School Students from Regular Classroom Activities for the Study of Instrumental Music: The Effect on Sixth-Grade Reading, Language, and Mathematics Achievement." Journal of Research in Music Education 33 (Spring 1985): 45-54.

academic achievement. In his study, Mr. Kvet was able to conclude that there is no significant difference in achievement between the music student and the non music students. To conduct this study Mr. Kvet used the services of four school districts of a major metropolitan area. His research and history of the discussion were quite extensive citing studies as far back as 1958 and from other parts of the world including Israel and England. This study might be used to conclude that the music students are somehow superior to the non-music students in that they are able to succeed in both areas. Mr. Kvet even cites a similar study by Bobitaille and O'Neal (1981) where it was shown that the instrumental music students scored higher in all areas when compared to non instrumental music students. This is one of only a few studies that address the controversy although it has raged on for years.

In a similar study review by Robert G. Sidnell[5] he concludes that Karen Wolfe's study which was trying to determine if there are non-musical outcomes as a result of music instruction is of great benefit to music instruction advocates. Her conclusions did support what she was trying to determine, namely that music has no effect on academic success, however it must be noted that the students who left the classroom for music instruction did not score lower in the academics despite being removed from the classroom. This reversal of her conclusions still allows this to be a positive study for music education in Sidnell's view.

A study published in *The British Journal of Educational Psychology* by R.J.Lang and K.A. Ryba is one of the most outstanding pieces I reviewed. Their purpose was to expand on earlier findings that "artistically expressive individuals tend to develop a marked preference for, and superior acuity within, varying sensory modalities beyond that of non-artistic persons."[6] This article is laden with historical references too numerous to mention. In addition, the integrity of the study is not compromised. Tests were given to evaluate creative thinking (Torrance Tests), preference for visual stimulus complexity (RA-WFPT), and musical perception (Mundinger Musical Perception Test—Pilot Version). Three groups of students were used in the study, musicians, artists and a control group. The evaluation and correlation of the material gathered are quite extensive and thorough. Each group was compared to the other two and the individuals were also categorized. Their findings suggest that the artistically creative individuals are superior in their ability for associating remote ideational concepts. They also concluded that "musically and artistic persons posses or develop similar cognitive attributes, although they can be distinguished from one another and from other university peers." This paper deserves wider discussion than can be devoted here and is recommended reading.

There is also the study conducted by Frances H. Rauscher and Gordon L. Shaw of the Center for Neurobiology of Learning and Memory, University of California, Irvine, CA 92717. In their initial paper presented to the National Association of Music Merchants Economic Summit, August 5-8, 1993, they indicate that "music training significantly enhanced performance on a specific non-verbal age-appropriate spatial reasoning task."[7] In this pilot study the researchers were able to show that scores on various tests improved as a function of music training. Subjects were tested before and after music instruction was

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5 Sidnell, Robert G. "Review of Achievement, Perceptual-Motor Development, Creative Thinking and School Attendance of First Grade Children by Karen L.Wolf" Council for Research in Music Education, 74 (Spring 1983): 83-87.

6 Lang, R.J. and K.A. Ryba. "The Identification of Some Creative Thinking Parameters Common To The Artistic and Musical Personality" British Journal of Educational Psychology 46 (1976): 46 267-279.

7 Rauscher, Frances H. and Gordon L. Shaw " Pilot Study Indicates Music Training of Three-Year-Olds Enhances Specific Spatial Reasoning Skills" Center for the Neurobiology of Learning and Memory, University of California, Irvine, CA 92717 Paper presented at the NAMM Economic Summit of the Music Products Industry, Newport Beach CA, August 5-8 1993.

given. The ANOVA was conducted as in other studies mentioned in this article. The students performed better on an Object Assembly task after music training. In the inner-city students, their Object Assembly scores nearly doubled after music instruction. There seems to be a correlation between music instruction and improvement in motor skills. The number of subjects however was very small (10) and the diversity of the students was broad. One group of five were from an inner-city day care center, the other five were from a school for the arts. Nevertheless, this study shows the significance of music as a learning tool. A bigger study was planned for the fall of 1993 based on the results of this small sample.

The results were presented in a paper and presentation presented at the American Psychological Association Annual Convention, August 13, 1994 in Los Angeles California.[8] Dr. Rauscher and her colleagues conducted a study that concluded that after listening to 10 minutes of Mozart, thirty six participants scored 8 to 9 points higher on the Stanford-Binet Intelligence Scale. This led to the hypothesis that repeated or extended exposure to music may enhance spatial task performance and spatial reasoning compared to participants who were exposed only to silence. The conclusions of the testing seem to indicate that students tended to perform significantly higher after music lessons than those of the no-music control group. Also an important point is the short amount of time it took to receive the results – 4 months. Dr. Rauscher intends to continue her studies including specific effects of Mozart and further studies in the preschool. It will, of course, be necessary for Dr. Rauscher to expose her results to the people who can use it to develop music as a necessary part of the education process. Too often has good research been completed but never presented in a useful format.

A short article in USA Today, August 14, 1994, Frances Rauscher of University of California, Irvine states that music lessons as short as 15 minutes a week appear to "strengthen the links between brain neurons and build new neural bridges needed for good spatial reasoning".

A press release from the American Psychological Association, August 13, 1994 states that music lessons or even simply listening to music can enhance spatial reasoning performance. It is a brief review of the above mentioned paper by Dr. Rauscher and Dr. Shaw.

In a recent interview for *Teaching Music*, Dr. Rauscher states that "the child who studies music will have enhanced spatial reasoning."[9] She goes on to give a brief description concerning her studies including her conclusions and future plans. She wants to expand her study to include older children as well as continue her present work with the children of disadvantaged families. This includes children who were born with drug addictions and are showing the greatest benefits from the study of music. It will be interesting to see if her work is taken seriously when completed. If so, then there is no doubt that music will be included as a requirement in every school system. It appears that finally there is some recognition of the importance of music in the curriculum.

"Students of the arts continue to outperform their non-arts peers on the SAT, according to reports by the College Entrance Examination Board." This is the opening statement in the April 1995 fact sheet issued by the National Coalition for Music Education. In 1994, students who had experience in music performance scored 49 points higher in the verbal portion and 36 points higher in the math portion of the test than students with no arts experience. It has also been shown that longer study in the arts means even higher scores.

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[8] Rauscher, Frances H., Gordon L. Shaw, Linda J. Levine and Katherine N. Ky " Music and Spatial Task Performance: A Casual Relationship", University of California, Irvine, CA 92717 Paper presented at the A.P.A. 102nd Annual Convention in Los Angeles, CA, August 13, 1994.

[9] Snyder, Neal "Frances Rauscher: Music and Reasoning", Teaching Music, 2 no. 5 (April 1995) 40-41, 50.

In an article by Steven J. Morrison[10] he relates the conclusions of a study performed by the National Center for Educational Statistics. The study asked many questions of the students who participated. Beginning with the question of wether or not they participated in music activities, music students are in definite minority with only 22.3 percent identifying themselves as music participants. However, the music participants received more than their share of awards and other recognition when examining who was elected class officer, academic honors and recognition for good grades. In addition, they also performed better in relation to grades received in the classroom. The students had a higher percentage of A's, A-'s, B's, and B-'s as compared to the percentage of students who did not participate in music classes.

In the report of The National Commission on Music Education, *Growing Up Complete: The Imperative for Music Education,* March 1991, there are references to the value of music education starting pre-kindergarten. One study showed that the reading level of first-grade students with one year of music was almost a grade higher than their peers without music. as the length of music instruction increased, the reading grade level also increased.[11] In addition, there was testimony that insisted that involvement in music affects self-esteem, self-expression, creativity and self-discipline.

In his paper, *Music Performance Group Membership and Academic Success: A Descriptive Study of One 4-Year High School,* Kevin J. McCarthy[12] reported that the students in the Concert Band scored significantly higher than nonperforming students on SRA scores in Language, Mathematics and the Composite score and have higher G.P.A.'s. In addition the members of the Varsity Band (9th graders) were absent fewer day than nonperformers. He concludes that members of instrumental groups score higher in academic studies even though they are equal in other areas such as socioeconomic levels and ethnicity. They also tend to be absent less which demonstrates the amount of personal responsibility that is instilled in students of instrumental music programs.

An article by Randy Royer in the Wyoming Music Educators Journal 1991 (month unknown) lists over 20 articles and reports that conclude that the study of music has the positive effects that have already been mentioned. Mr. Royer can be contacted at Evanston Middle School, P.O. Box 6002, Evanston, WY 82931-6002. A listing of some of these references included here. Also included here is a report, *Does Music Have an Impact On The Development of Students?* from the California Music Educators Association, 1990, provided by M.E.N. C., that cites many articles and studies to support these conclusions that continue to support the position of continuing to include instrumental music education in the curriculum.

In the *Journal for Middle Level and High School Administrators,* Karl Glenn[13] attempts to show how education in the arts can prepare future workers for success. He is very supportive of the arts and makes some good points. However, there is no evidence of any research having been done to support his claims. Even his statement of the numbers of minorities and predictions of numbers in the future lack any reference to studies or have any basis in actual experimentation on the author's part. There is much

[10] Morrison, Steven J. " Music Students and Academic Growth" Music Educators Journal, 81 no. 2 (Sept. 1994): 33-36.

[11] From the testimony of John Waltrip, President of Waltrip Music Centers of Arcadia, California, at the commision's Los Angeles Forum, September 18, 1990.

[12] McCarthy, Kevin J. "Music Performance Group Membership and Academic Success: A Descriptive Study of One 4-Year High School" presented at The Colorado Music Educators Association, January 31, 1992

[13] Glenn, Karl. "The Many Benefits of Music Education—Now and in The Future" The Journal for Middle Level and High School Administrators NASSP Bulletin 76 (May 1992): 1-4.

discussion of the benefits of music education in the workplace. He has a quotation from Shirley Young, a Chinese woman who is now a vice president for General Motors. The quotation says that the Japanese people consider the study of music very important. She says "Playing a musical instrument involves discipline, creativity and conceptualization. These attributes added to engineering talent, help produce products that are not only functional, but also harmonious in every way." As way of a conclusion Mr. Glenn calls for all those involved in music education to bring the message of the importance of music education to the "nation's decision makers" I generally agree with his thoughts and some facts he employs may be useful but with only first hand observation and several quotes from other sources it is not possible to use the article as part of a representation in support of art education.

METHODOLOGY

The study used a two group static-group comparison design. The data collected consisted of fourth grade and sixth grade test scores of the California Test of Basic Skills, which is administered toward the end of the fourth and sixth grade school year. The five scores were recorded and then analyzed by using an independent two sample, t-test.

SAMPLE

Anne Arundel County, Maryland is an east coast county of 471,431 just south of Baltimore, MD. The county school system serves 74,412 students from diverse cultural and socio-economic backgrounds. The area of Glen Burnie is predominantly blue-collar middle to lower middle class, but also contains white-collar professional, working poor and those on assistance.

The sample of 223 students consisted of the fourth, fifth and sixth grades from two schools in the Glen Burnie area of the county. Instrumental music students are excused from their academic classroom twice a week using a rotating schedule. The rotating schedule insures that the students do not miss the same academic time more than once every eight weeks.

INSTRUMENT

The California Test of Basic Skills (CTBS McMillian/McGraw Hill School Publishing Co.)was used to compare MS and NS academic achievement. This test is used to measure outcomes in reading, language comprehension, math comprehension, science and social studies and to compare the individual performance of students throughout the country.

All students who completed an entire year in the fourth grade instrumental music program were considered and those that completed two entire years in the fifth grade were considered. Any student who did not complete the entire year as an instrumental music student was eliminated from the study. In addition, students who did not take the C.T.B.S. were also eliminated from this study. The scores from the remaining students were recorded and the students with instrumental music experience were segregated in order to establish group number one.

ANALYSIS

A two sample, independent t-test was computed on MiniTab (Addison Wesley Publishing) to determine if a statistically significant difference existed between the two groups. The t-test, mean, standard deviation, SE mean and p value of each category of the test were calculated and

compared. It was determined that .05 would serve as the alpha level of significance testing.

FINDINGS

In all but 3 categories, it was found that the difference of means between MS and NS was found to be not statistically significant. This may be due in part to the small size for music students. In the categories where the NS scored a higher mean, the difference is deemed as insignificant due to the p values\and t scores that accompany these 3 categories. The p values and t scores would also indicate a support for the original hypothesis.

Table 1
Results of MS (n=17) and NS (n=80) Achievement on CTBS for school 1 after 1 year of study

	MEAN	STDEV	SE MEAN	T	P
Reading					
Group 1 (MS)	633.2	51.6	13		
Group 2 (NS)	621.2	31.8	3.6		
				0.92	0.82
Language Comp					
Group 1 (MS)	623.6	51.0	12		
Group 2 (NS)	620.7	32.2	3.6		
				0.23	0.59
Math Comp					
Group 1 (MS)	608.6	39.3	9.5		
Group 2 (NS)	611.2	31.3	3.5		
				-0.25	0.40
Science					
Group 1 (MS)	606.0	149	36		
Group 2 (NS)	623.0	33.9	3.8		
				-0.46	0.32
Social Studies					
Group 1 (MS)	634.1	57.9	14		
Group 2 (NS)	630.8	36.2	4.0		
				0.22	0.59

Table 2
Results of MS (n=5) and NS (n=47) Achievement on CTBS for school 2 after 1 year of study

	MEAN	STDEV	SE MEAN	T	P
Reading					
Group 1 (MS)	649.0	27.1	12		

Group 2 (NS)	633.9	34.4	5.0		
				1.15	0.85
Language Comp					
Group 1 (MS)	633.4	16.3	7.3		
Group 2 (NS)	631.9	33.1	4.8		
				0.17	0.57
Math Comp					
Group 1 (MS)	627.2	18	8.1		
Group 2 (NS)	617.2	28.4	4.1		
				1.10	0.84
Science					
Group 1 (MS)	663.0	59.9	27		
Group 2 (NS)	628.5	24.6	3.6		
				1.28	0.86
Social Studies					
Group 1 (MS)	645.4	32.2	14		
Group 2 (NS)	638.5	26.1	3.8		
				0.46	0.67

Table 3
Results of MS (n=24) and NS (n=60) Achievement on CTBS for school 1 after 2 years of study

	MEAN	STDEV	SE MEAN	T	P
Reading					
Group 1 (MS)	662.3	58.2	12		
Group 2 (NS)	629.4	42.8	5.5		
				2.52	0.99
Language Comp					
Group 1 (MS)	650.4	39.4	8.0		
Group 2 (NS)	630.3	31.3	4.0		
				2.24	0.98
Math Comp					
Group 1 (MS)	637.8	28.3	5.8		
Group 2 (NS)	624.4	28.5	3.7		
				1.95	0.97
Science					
Group 1 (MS)	642.4	39.7	8.1		
Group 2 (NS)	631.0	34.3	4.4		
				1.24	0.89
Social Studies					

Group 1 (MS)	654.0	28.0	5.7		
Group 2 (NS)	639.7	29.2	3.8		
				0.22	0.59

Table 4
Results of MS (n=9) and NS (n=21) Achievement on CTBS for school 2 after 2 years of study

	MEAN	STDEV	SE MEAN	T	P
Reading					
Group 1 (MS)	671.4	21.8	7.3		
Group 2 (NS)	658.0	25.3	5.5		
				1.48	0.92
Language Comp					
Group 1 (MS)	661.9	20.9	7.0		
Group 2 (NS)	669.0	24.6	5.4		
				-0.80	0.22
Math Comp					
Group 1 (MS)	675.1	27.5	9.2		
Group 2 (NS)	661.5	24.3	5.3		
				-0.25	0.40
Science					
Group 1 (MS)	674.8	19.5	6.5		
Group 2 (NS)	663.6	21.4	4.7		
				1.40	0.91
Social Studies					
Group 1 (MS)	634.1	57.9	14		
Group 2 (NS)	630.8	36.2	4.0		
				0.22	0.59

CONCLUSION

The findings indicate there is no significant difference between the scores of MS and NS, and the original hypothesis is proven. It is is realized that there are other variables that were not taken into account during this study that may significantly influence the scores of the standardized test in addition to the study of music. Also, due to the small size of the samples and the limited scope of the study it is recommended that further studies be undertaken in greater depth and detail.